

## CLAIMS

What is claimed is:

1. A micro-optical component, comprising:
  - an optical element for interacting with an optical beam; and
  - 5 a mounting structure for attaching the optical element to an optical bench;
  - wherein the optical element is solid-phase welded to the mounting structure.
2. A micro-optical component as claimed in claim 1, wherein the optical element is thermocompression bonded to the mounting structure.
3. A micro-optical component as claimed in claim 1, wherein the optical element is 10 thermosonically bonded to the mounting structure.
4. A micro-optical component as claimed in claim 1, wherein the optical element is ultrasonically welded to the mounting structure.
5. A micro-optical component as claimed in claim 1, wherein the optical element comprises a lens substrate.
- 15 6. A micro-optical component as claimed in claim 1, wherein the optical element comprises a microelectromechanical device.
7. A micro-optical component as claimed in claim 1, wherein the optical element comprises a Fabry-Perot tunable filter.
8. A micro-optical component as claimed in claim 1, wherein the mounting structure 20 is fabricated from a metal.
9. A micro-optical component as claimed in claim 1, wherein the mounting structure is metal coated.

10. A micro-optical component as claimed in claim 1, wherein the mounting structure is coated with a thermocompression bond metal.

11. A micro-optical component as claimed in claim 10, wherein the bond metal comprises gold.

5       12. A micro-optical component as claimed in claim 1, further comprising depositing bond metal bumps on the mounting structure.

13. A micro-optical component as claimed in claim 1, further comprising depositing bond metal bumps on the optical element.

14. A micro-optical system, comprising:

10       an optical element for interacting with an optical beam;

      a mounting structure, the optical element being solid-phase welded to the mounting structure; and

      an optical bench, the mounting structure being solder bonded to the optical bench.

15       15. A micro-optical system as claimed in claim 14, wherein the optical element is thermocompression bonded to the mounting structure.

16. A micro-optical system as claimed in claim 14, wherein the optical element is thermosonically bonded to the mounting structure.

17. A micro-optical system as claimed in claim 14, wherein the optical element is ultrasonically welded to the mounting structure.

20       18. A micro-optical system as claimed in claim 14, wherein the optical element comprises a lens substrate.

19. A micro-optical system as claimed in claim 14, wherein the optical element comprises a microelectromechanical device.

20. A micro-optical system as claimed in claim 14, wherein the optical element comprises a Fabry-Perot tunable filter.

21. A micro-optical system as claimed in claim 14, wherein the mounting structure is fabricated from a metal.

5        22. A micro-optical system as claimed in claim 14, wherein the mounting structure is metal coated.

23. A micro-optical system as claimed in claim 14, wherein the mounting structure is coated with a thermocompression bond metal.

10      24. A micro-optical system as claimed in claim 23, wherein the bond metal comprises gold.

25. A micro-optical system as claimed in claim 14, further comprising depositing bond metal bumps on the mounting structure.

26. A micro-optical system as claimed in claim 14, further comprising depositing bond metal bumps on the optical element.

15      27. A process for assembling an optical system, the process comprising:  
solid-phase welding an optical element to a mounting structure; and then  
attaching the mounting structure to an optical bench.

28. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises thermocompression bonding the mounting structure and the optical element.

20      29. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises thermosonically bonding the mounting structure and the optical element.

30. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises ultrasonically bonding the mounting structure and the optical element.

31. A process as claimed in claim 27, wherein the step of attaching the mounting structure to the optical bench comprises solder bonding the mounting structure to the optical bench.

32. A process as claimed in claim 27, wherein the step of attaching the mounting structure to the optical bench comprises:

depositing solder material on solder mating surfaces of the mounting structure and  
10 the optical bench;

reflowing the solder material to join the mating surfaces.

33. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises coating weld mating surfaces of the optical element and the mounting structure with bond material.

15 34. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises coating weld mating surfaces of the optical element and the mounting structure with gold.